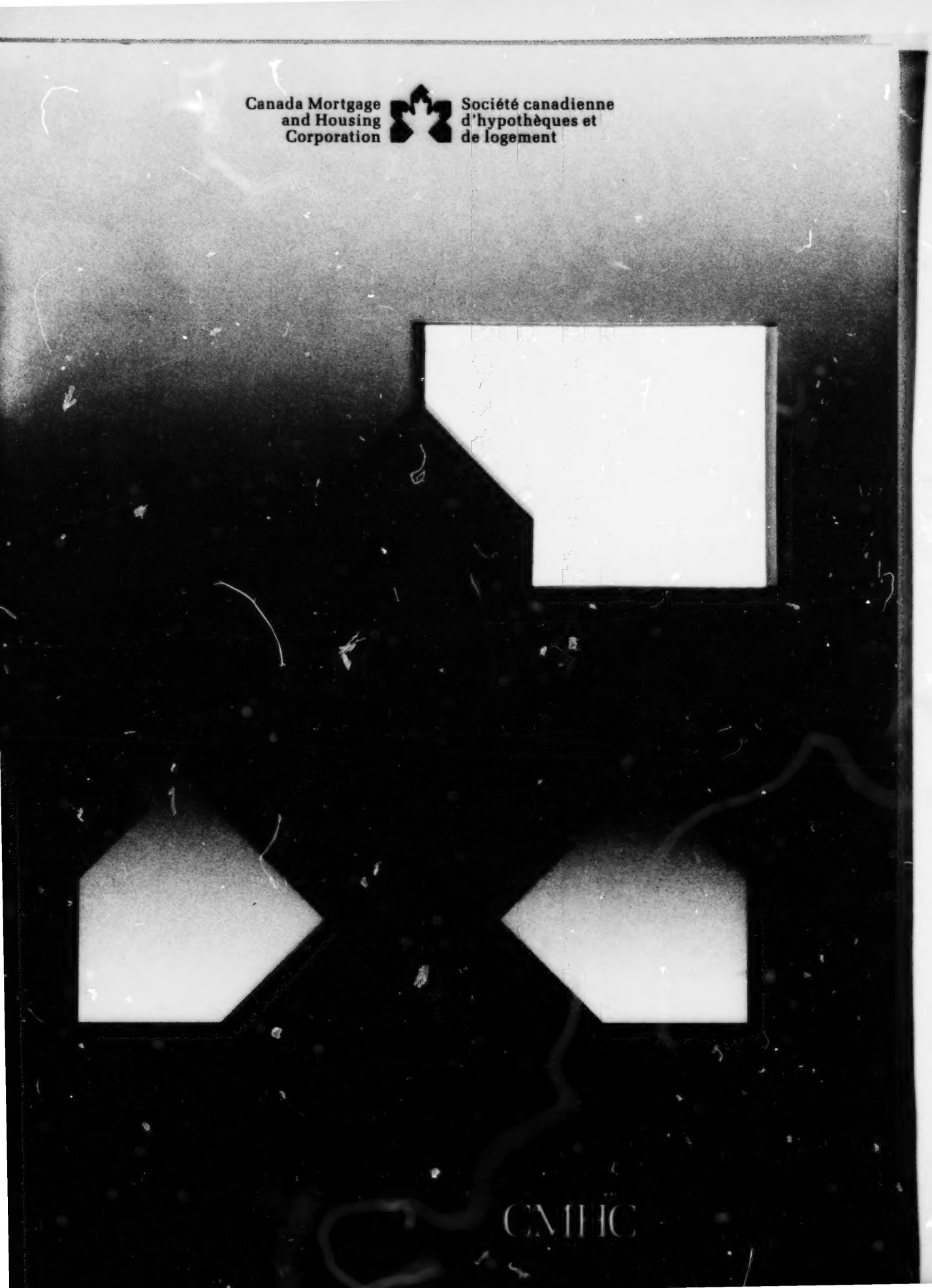
Canada Mortgage
and Housing
Corporation
Société canadienne
d'hypothèques et
de logement
CMHC

Cal
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c.1

RURAL AND NATIVE HOUSING DEMONSTRATION PROGRAM

BY THERMOCUBE INC.

REPORT AND CONSTRUCTION MANUAL

Prepared for

Project Implementation Division
Policy, Research and Programs Sector
Canada Mortgage and Housing Corporation

by

THERMOCUBE INC.
Longueuil, Quebec

May 1987

Senior Consultant: Raymond Couture

CMHC Project Manager: Jacques Rousseau

Canada Mortgage and Housing Corporation
Société canadienne d'hypothèques et de logement

Canadian Housing Information Centre
Centre canadien de documentation sur l'habitation

Canada Mortgage and Housing Corporation, Canada's Housing Agency, has as a mandate to apply the National Housing Act.

The objective of this Act is to assist in improving housing and living conditions in Canada. That is why the Corporation is interested in everything which concerns housing, urban development and expansion.

Under the terms of Part V of the Act, the Government of Canada authorizes CMHC to allocate funds to research on the technical and socio-economic aspects of housing and related fields, and to publish and disseminate the results of this research work. Thus CMHC has a legal obligation to see that any information which could be used to improve housing and living conditions be disseminated to the greatest possible number of people or groups.

This publication is one of the many means of information which CMHC has produced with the help of federal government funds.

DEVELOPMENT OF THE STUDY

This study was carried out by THERMOCUBE INC. for Canada Mortage and Housing Corporation, under Part V of the National Housing Act.

The analyses, interpretations and recommendations are those of the consultants and thus do not necessarily reflect the views of CMHC.

THERMOCUBE

CELLULAR HERMETICALLY SEALED CAISSON MADE ENTIRELY OF WAFERBOARD PANELS, STAPLED AND "WELDED" TO THE P.V.A. RESIN, FACTORY PRODUCED REGIONALLY.

1 TECHNICAL DESCRIPTION OF TYPICAL CAISSON SYSTEM:

A) ROOF CAISSON SYSTEM
- 1- 12 INCHES OF GLASS WOOL (R-40)
- 2- WAFERBOARD: 7/16 OF AN INCH
- 3- DIVIDER: 23 INCHES O.C.

B) LINTEL BEAM
- 4- 8 INCHES OF MINERAL WOOL (R-28)
- 5- HERMETICALLY SEALED JOINT (FIBERGLASS)

C) WALL CAISSON SYSTEM
- 6- HERMETICALLY SEALED JOINT (FIBERGLASS AND ANCHORING TIE)
- 7- CAULKED CAISSON JOINT
- 8- GYPSUMBOARD AND VAPOR BARRIER
- 9- INTERIOR REINFORCING FURRING
- 10- NOTCH FOR ELECTRIC WIRING

D) FLOOR
- 11- 5/8 INCH THICK BOARDS
- 12- FLOOR JOISTS

THERMAL RESISTANCE RATING WITH FINISH
ROOF = 42.8 WALL = 30.8
RESISTANCE OF THE WALLS: 7,000 LBS. PER LINEAR FOOT
RESISTANCE OF THE ROOF: 192 LBS PER SQUARE FOOT
EXCEPTIONAL SOUNDPROOFING QUALITY.

REPORT

RURAL AND NATIVE HOUSING

DEMONSTRATION PROGRAM

TECHNICAL DETAILS/DEVELOPMENT OF A CONSTRUCTION SYSTEM

Prepared for:

CANADA MORTGAGE AND HOUSING CORPORATION
682 Montreal Road
Ottawa, Ontario K1A 0P7

Contact: Jacques Rousseau, Project Manager

By:

THERMOCUBE INC.
98 Ste-Foy Boulevard
Longueuil, Quebec J4J 1W6

Contact: Raymond Couture, President

Longueuil, Quebec, Canada
30 March 1987

CMHC SUMMARY

TITLE

Rural and Native Housing Demonstration Program
by THERMOCUBE INC.
Report and Construction Manual

INTRODUCTION

The clients eligible under the Rural and Native Housing Demonstration Program are required to provide all the labour for the construction of their own house on a "do-it-yourself" basis.

Given that their previous experience in construction is often limited, such clients could benefit from the use of house kits which correspond to their skills and understanding, since the concept has been simplified and made easy to assemble.

OBJECTIVE

To adapt the THERMOCUBE System to meet the criteria and budget limitations of the Demonstration Program.

METHODOLOGY

The consultant has produced a house plan, working drawings, assembling instruction, a construction manual for use by the builder owner and a summary of the report which includes a breakdown of the construction costs.

CONCLUSION

It appears quite possible and particularly easy to adapt the THERMOCUBE System to meet the restrictions of the Demonstration Program. It would be necessary to consider the construction of a small number of units using this system during the last part of this program year in order to assess the efficiency of this house kit compared to conventional methods. We are convinced that this will clearly show just how interested and enthusiastic builder owners are in seeing their houses take shape rapidly due to the simplicity of the THERMOCUBE principle, as well as the pleasure there is in applying finish material on regular plain surfaces.

RURAL AND NATIVE HOUSING DEMONSTRATION PROGRAM

LIST OF DOCUMENTS

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C-	Breakdown of Kit Costs	8
D-	Production Specifications	9 to 12
E-	Construction Plan: Model #2010 B-R.O. including perspective - Scale 1-50	13 to 19
F-	Complete Foundation Plan	20
G-	Foundation Plan on Piers	21 to 23
H-	Assembling Plan	24 to 29
I-	List of units by order of installation	30
J-	Details re: Assembling and Fastening	31
K-	Assembling Instructions	32 to 35

MANUAL

CONSTRUCION MANUAL FOR

AN 80 SQUARE METRE (860 SQUARE FOOT)

3 BEDROOM HOUSE

PRODUCT DEVELOPED AND PATENTED BY:

THERMOCUBE Inc.

The preparation of the Manual was

subsidized by CMHC

with the technical assistance of
Messrs Gilles Mérineau and Jacques Soucy
CMHC Regional Office, Montreal, Quebec

* * *

THE ECONOMICAL HOUSE
IN CANADA

FOR

RURAL AND NATIVE PEOPLE

PROPOSED BY

"THERMOCUBE"

* * *

MARCH 1987

87.03.27

CHARACTERISTICS

THE ECONOMICAL HOUSE FOR RURAL AND NATIVE PEOPLE

This file contains a proposal for a comfortable and long-lasting house using THERMOCUBE technology. All the materials are manufactured in Canada and are easily available from many supply sources.

DESIGN

The design which was chosen is aesthetically pleasing and economical thus respecting the requirements of CMHC's specifications. It was important to produce a building which can be easily moved and whose construction would be simple compared to conventional wood-frame buildings. Moreover, the design was to facilitate "personalization" to meet requirements associated with the quality of life of the residents. Here we are thinking in terms of distinct socio-cultural environments, of an ecological integration of the building in a natural milieu, of the possibility of "understanding" one's dwelling to be able to maintain it while conserving its qualities of comfort and durability.

TRANSPORTATION

The sturdy nature of the THERMOCUBE cellular hermetically sealed caissons facilitates transportation and thereby represents a saving. We are thinking of the conditions experienced by those involved in transporting pre-fabricated houses on the road to James Bay early in the 1960s ... Neither the conditions of the roads, nor the seasons can impede the transportation of the components. Their sturdy nature is based on the fact that they are structural and can easily be piled without any fear of giving way.

Loading and unloading the units can be done either mechanically or manually. For the heaviest THERMOCUBE components, one cubic foot weighs approximately 3 kg (6 lbs). Trucks, trailers, boats, barges, trains, cargo planes, all these types of transportation are suitable. The maximum width of a panel is 1,200 mm (4 feet).

INSTALLATION

Once the base of the house is completed, (foundations and floor) the installation takes place in gradual stages as per the assembling specifications. Easily and rapidly installed with a minimum knowledge required of the product and of its assembling, this technology can be

applied in any climatic condition whatsoever. Wood which is frozen cannot be split by nails since it is very dry. A crane is not necessary since the heaviest components can be handled by four men without any superhuman effort being necessary. The installation of the exterior sheathing can be delayed several weeks without damaging the caissons in any way.

This basically sequential and linear strategy is an incentive for assemblers. Similarly, one does not have to wait until the end of construction to inspect the work; the inspection is also effected on a stage by stage basis, thus making it possible to go back and make repairs if there has been an error without this requiring costly work.

HEATING

The wall, once the sheathing is installed, has a comparative R value of 30. And as for the roof, it should suffice to say that it also, with an R value of 43, is far above the minimum standards. No claim is made here as pertains to savings in heating costs since the windows and doors, the floor and basement insulation as well as the habits of the residents are not linked to THERMOCUBE products. However, certain conclusions should be self-evident. It should not be overlooked that

each airtight joint is caulked on the inside and on the outside. The joints around the electrical switch plates on the walls are completely airtight! The electrical wiring is installed in the very narrow space created by the furrings to which the ceiling finish is applied. Openings made in the walls for air intake, chimney, etc. respect a modification specification for the product without in any way affecting the airtightness of the cellular caissons.

With the house thus being quasi hermetically sealed, it is strongly recommended to install an air exchange system, which in most cases can be limited to an air intake in a lower section of the dwelling together with an air outlet installed in a higher section both with gravity controlled flaps. Thus the quality of the living environment would be enhanced by purer and less humid air.

OTHER SAVINGS

The THERMOCUBE concept also produces other substantial savings. One has only to think of interior and exterior sheathing which can be applied directly on the panels without any furrings. The surface is solid. Nails can be used anywhere on the surface. Cases where the sheathing splits due to drying and shrinking of the wood are eliminated since the panels are dried to begin with. Maintenance is facilitated

accordingly. The stability of the raw materials as well as the homogeneity means a savings in time in carrying out the work.

Being able to put up the house in a relatively short period of time means that it is easier to control activities on-site and this also represents a savings. Loss and/or theft of materials on-site is greatly limited. Since the building envelope can be put up quickly, supplies can be stored inside the envelope, as well as tools, etc. It may be possible to reduce the number of project advance inspections since the foundation, the floor and the structure of the house, as well as the roofing, the electrical intakes, and the windows can all be inspected in one visit. All this being done in a week.

It is also possible to make savings on interior partitions by adopting a rustic style. These partitions can even be made moveable as needed by the residents.

FOUNDATION

Several types of foundation are suitable for the THERMOCUBE hermetically sealed system. The conventional concrete foundation is a luxury item. Using a crawl space as an economic solution with a well insulated floor could be considered. If the lot is uneven, we would

suggest underground or surface piers. It may be impossible for concrete cement mixers to come on-site. Many solutions are possible.

Small buildings may be pulled on sleighs in the winter to get across lakes or waterways. The sturdiness of the THERMOCUBE system can be put to the test.

HOUSING QUALITY

Without any undue pretentions, THERMOCUBE is developing a social vocation. A large number of Canadians can finally become the owners of quality homes. All levels of government in Canada are well aware of the housing problems experienced by certain groups within our country. CMHC, under its mandate, applies government decisions. The private sector must become involved in solving Canadian problems. THERMOCUBE will certainly contribute in this respect.

87.03.27

ECONOMICAL HOUSE FOR THE RURAL AND NATIVE POPULATION

CMHC PROJECT BY THERMOCUBE INC.

Estimated Cost		Floor Area 860	Assessment of Hours of Labour per Homeowner
		$	H/H
Grading, Foundation and Draining (on Piers)	"B"	1,000.00	75
Floor Material	"B"	1,600.00	20
THERMOCUBE Shell (F.O.B. Factory)	"F.P."	8,500.00	50
Transportation (limit of 50 km)	"B"	200.00	-
Roofing and Joists	"B"	600.00	25
Windows and Doors	"B"	1,600.00	20
Exterior Sheathing (Vinyl)	"B"	900.00	30
Electricity and Heating	"B"	2,000.00	-
Plumbing and Accessories	"B"	1,000.00	40
Partitions and Interior Sheathing (including Gypsumboard, accessories and paint)	"B"	2,500.00	120
Interior trim (including doors and stairs)	"B"	900.00	50
Kitchen Cabinets and Vanity	"B"	1,000.00	20
Flooring (allocation)	"B"	1,000.00	40
TOTAL:		22,800.00	490 H/H
Metal Chimney 7" X 12'	"B"	300.00	10
Complete Foundation (additional cost for forms and concrete)	"B"	3,000.00	100
Roof Skylights "Optional"	"B"	700.00	20
Supervision for Assembly - Shell (one day + travel time)	"B"	300.00	
Water and Sewage System			

FIRM PRICE: (1987) "F.P." BUDGET: "B"

N.B.: These prices are based on rates for the central region of Quebec.

87.03.27

BREAKDOWN OF THE KIT COSTS

(Confidential, for Internal CMHC Use)

Materials, including taxes	$5,100.00
Royalties: Technology	$400.00
Factory Labour	$1,000.00
Overhead and Administration	$1,000.00
Profit	$1,000.00
Total	$8,500.00

87.03.18

THERMOCUBE INC.

CELLULAR HERMETICALLY SEALED CAISSON HOUSE SYSTEM

(SANDWICH TYPE)

PRODUCTION SPECIFICTIONS AND QUALITY CONTROL

STORAGE OF RAW MATERIALS

The waferboard (W.B.) (stamped 1st quality) as well as the reinforcing accessories shall be stored in a dry location, to protect them against humidity before processing and assembling.

CUTTING OF THE COMPONENTS

Each component will be cut on all sides or angles using precision gauges thus ensuring that the components fit together perfectly which will contribute to equally distributing the charges to all the modules.

Maximum tolerance:	Dividers	- 1/32"
	Dimension of the caissons	- 1/16"
	Squaring of the caissons	- 1/16"

WORK TEMPERATURE

A minimum temperature of 15°C must be maintained during the production period and particularly during the bonding and curing period.

ANCHORING AND CONTACT POINTS

All the surfaces coming into contact with glue or with mechanical fastening devices shall be free of all dirt and dust as well as any trace of wax to ensure adequate penetration of the adhesive. (The procedure used to manufacture waferboard includes the addition of a coat of surface wax, the thickness of which varies depending on the manufacturer, on one or on both sides.)

Special care will be taken to make sure that laminated surfaces are perfectly flat to ensure adequate adherence of the glue.

ADHESIVE

Catalyzed acetate polyvinyl 1000 RESIN as manufactured and distributed by "les Adhésifs Canadiens", 420 Marien, Montreal must be used and applied following the manufacturer's instructions. Never use a glue which can be obtained at the corner hardware store. If the glue has frozen, it is no longer good.

CURING TIME FOR THE ADHESIVE

After assembling the caissons, it will be necessary to wait at least 8 hours before transporting or installing them to allow for adequate curing of the adhesive in a heated area with a temperature of at least 15°C.

Physical tests of the quality of the adhesive shall be made periodically, dated and verified in the presence of a THERMOCUBE representative. Moreover, the source and the delivery date of the adhesive shall be registered for each test. These results shall remain available also to be consulted by CMHC representatives during their site visits.

ASSEMBLING

Each module will be assembled on a jig which will ensure that all the components are glued and stapled in their exact position and will systematically be submitted to the standard pressure required.

MECHANICAL FASTENING DEVICES AND GLUE

Materials -

Staples: Resinated Grade: 8 mm wide (16 G.)
Adhesive: No. 1000 P.V.A. Resin manufactured by "Adhésifs Canadiens"
Surfaces to be covered with glue: The roughest side of the waferboard must always be used as the surface on which the glue is to be spread to ensure good penetration of the adhesive.
Application: A generous coat of glue is applied on one of the two surfaces to be glued together and particular care will be taken to complete the stapling procedure within three minutes. (IT IS IMPERATIVE THAT ONE BE ABLE TO SEE EXCESS GLUE FLOW OUT ALL ALONG THE JOINT.)

Mechanical Fastening Devices (Spacing of Staples) -

Laminating of frames: (Composed of 2 W.B., 11 mm (7/16" thick, plus waferboard stiffeners as per details) use staples long enough to penetrate the total thickness of the material.

Components less than 50 mm (2") wide: Staples spaced 75 mm (3") o.c., and staggered.

Components more than 50 mm (2") wide: Staples spaced 100 mm (4") o.c., and staggered.

Assembling the panel frames, fastening devices at the corners: Minimum 40 mm (1 ½") staples spaced 25 mm (1") o.c. in both directions.

It should be noted that these members can be installed in two stages. For laminated sides, the jointing shall overlap by at least 900 mm (36").

Interior or exterior cladding (made up of 11 mm (7/16") thick wafer board), 45 mm (1 ¾") staples spaced 75 mm (3") around the whole perimeter, and 25 mm (1") staples spaced 100 mm (4") o.c. along the central edge. (See stapling details.)

It should be noted that these surfaces must be uninterrupted, thus without any joints. In the case of units exceeding 480 cm (16') in length, refer to the jointing details recommended by THERMOCUBE.

It should be noted that all the interior and exterior perimeters shall be chamfered allowing an opening of at least 1/8" X 1/4" for adequate caulking.

For the type of caulking recommended, see installation specifications.

PRODUCTION STAGES

Each stage shall be well defined and organized, allowing for constant and automatic verification of important points thus ensuring perfect control of the production stages so that it would be impossible to make a mistake or to neglect any item which could cause any defect whatsoever during production.

THERMOCUBE reserves the right to effect test cuts in a sample of its choice to ensure the quality both of the glue as well as the quality of the insulating material. If the result is conclusive, THERMOCUBE undertakes to compensate the manufacturer for the costs incurred.

PROTECTION

Once the caissons have been installed, all the edges or cuts exposed shall be coated with a primer paint to protect them from humidity during transportation and installation. This primer paint shall be mixed specifically for application on waferboard and applied following the manufacturer's instructions. THERMOCUBE recommends primer paint # 217 manufactured by Industries Pépin Ltée, blue stain, or the equivalent approved in advance by THERMOCUBE.

HANDLING

The sturdy nature and the remarkable rigidity of these hermetically sealed cellular caissons means that it is almost impossible to damage them under normal handling conditions. However, as an additional precaution, it is recommended to take all the care necessary in particular circumstances.

Any module which is accidentally damaged shall be replaced. Any repair shall be approved in advance by an official THERMOCUBE representative.

NOTICE

Any opening in the roof or walls to install a fan, chimney, etc. is to be encased and sealed independently so as to ensure that no air or humidity penetrates inside the caissons. (See details concerning openings made in caissons.)

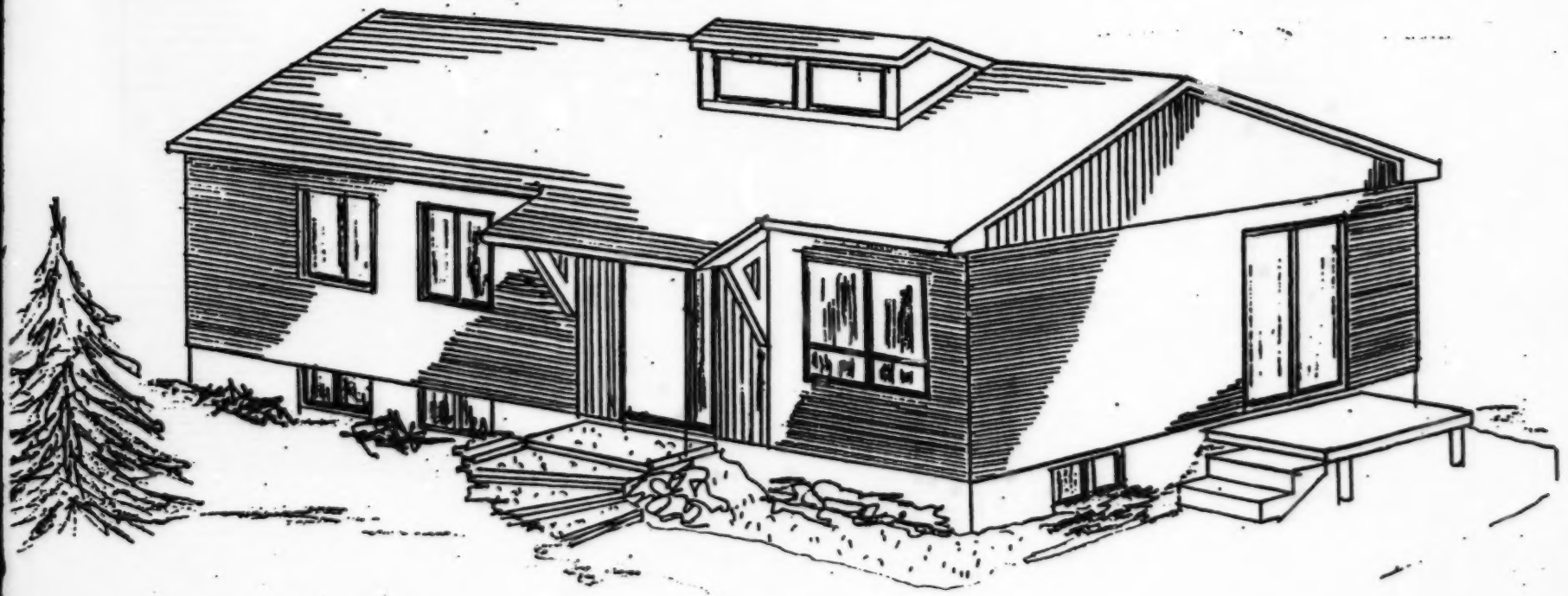
THERMAL INSULATION

Wall: Fiberglass R-28
Roof: Fiberglass R-40

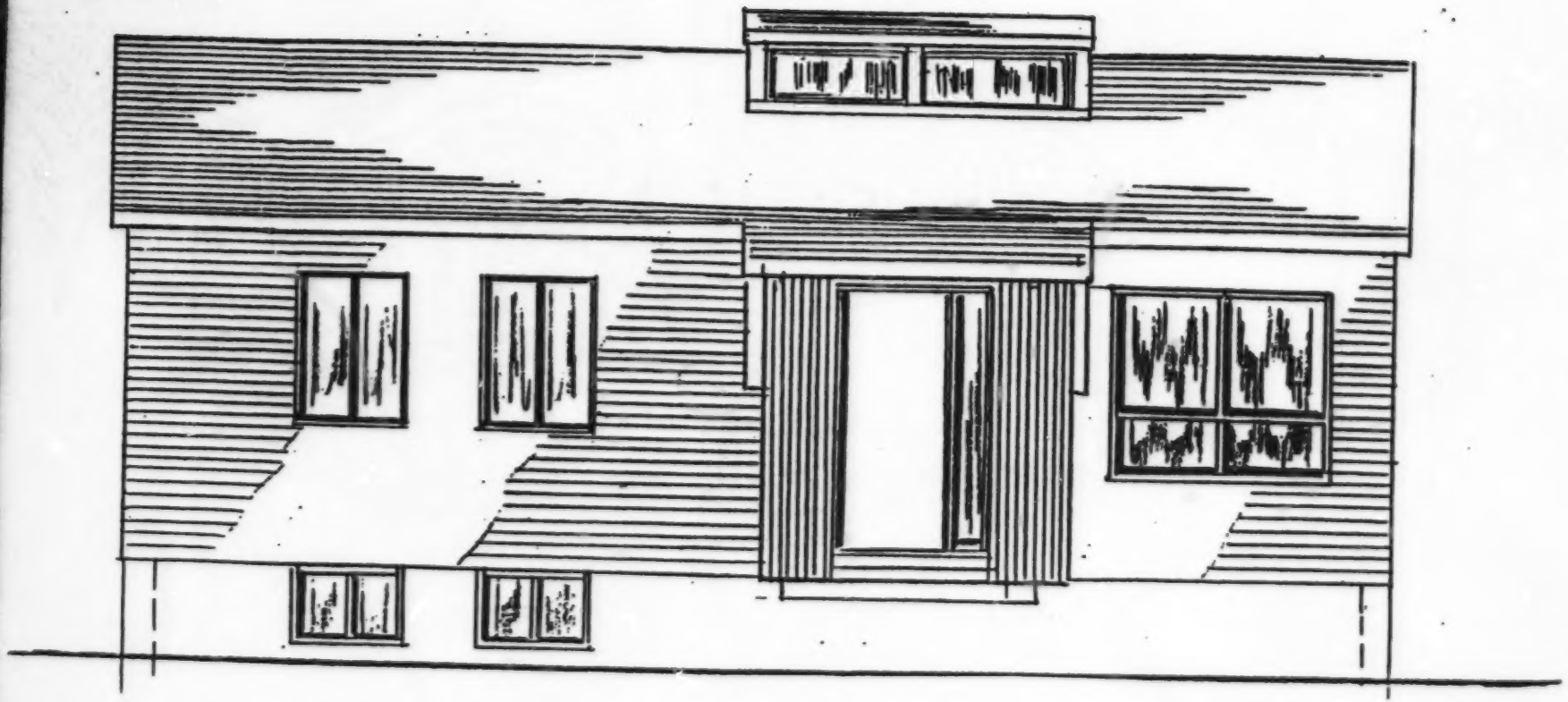
The interior dimensions of the cells containing the fibreglass bats must be at least 1/20 less than the dimensions of the bats in both directions to ensure a friction fit all around the perimeter of the cells and to thus avoid any possibility of uninsulated cracks. In other words, the bats, in their three dimensions, must measure from 3 to 5% more than the dimensions of the cells.

LIMIT OF THE WARRANTY CONTAINED IN THE THERMOCUBE'S SPECIFICATIONS

Failure to respect any one of the clauses in the production specifications renders the five-year THERMOCUBE warranty null and void.

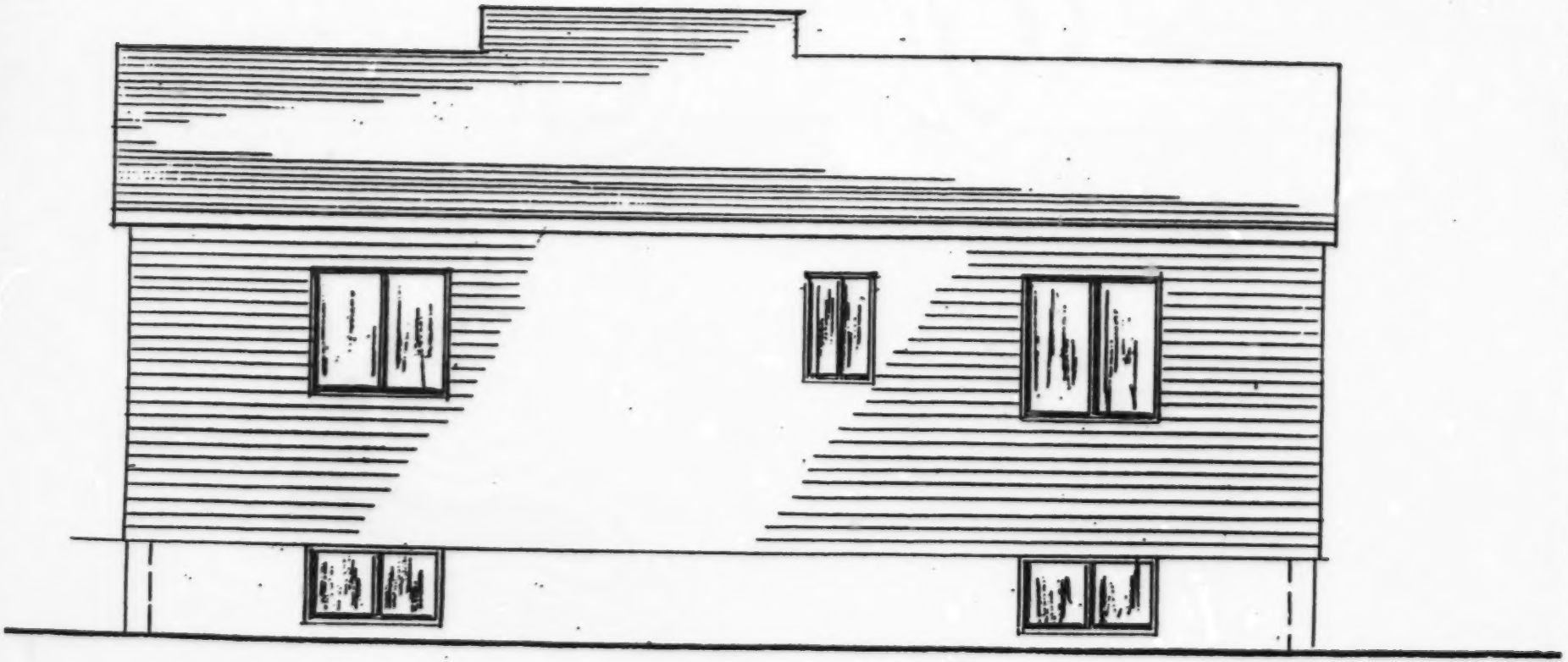


THERMOCUBE



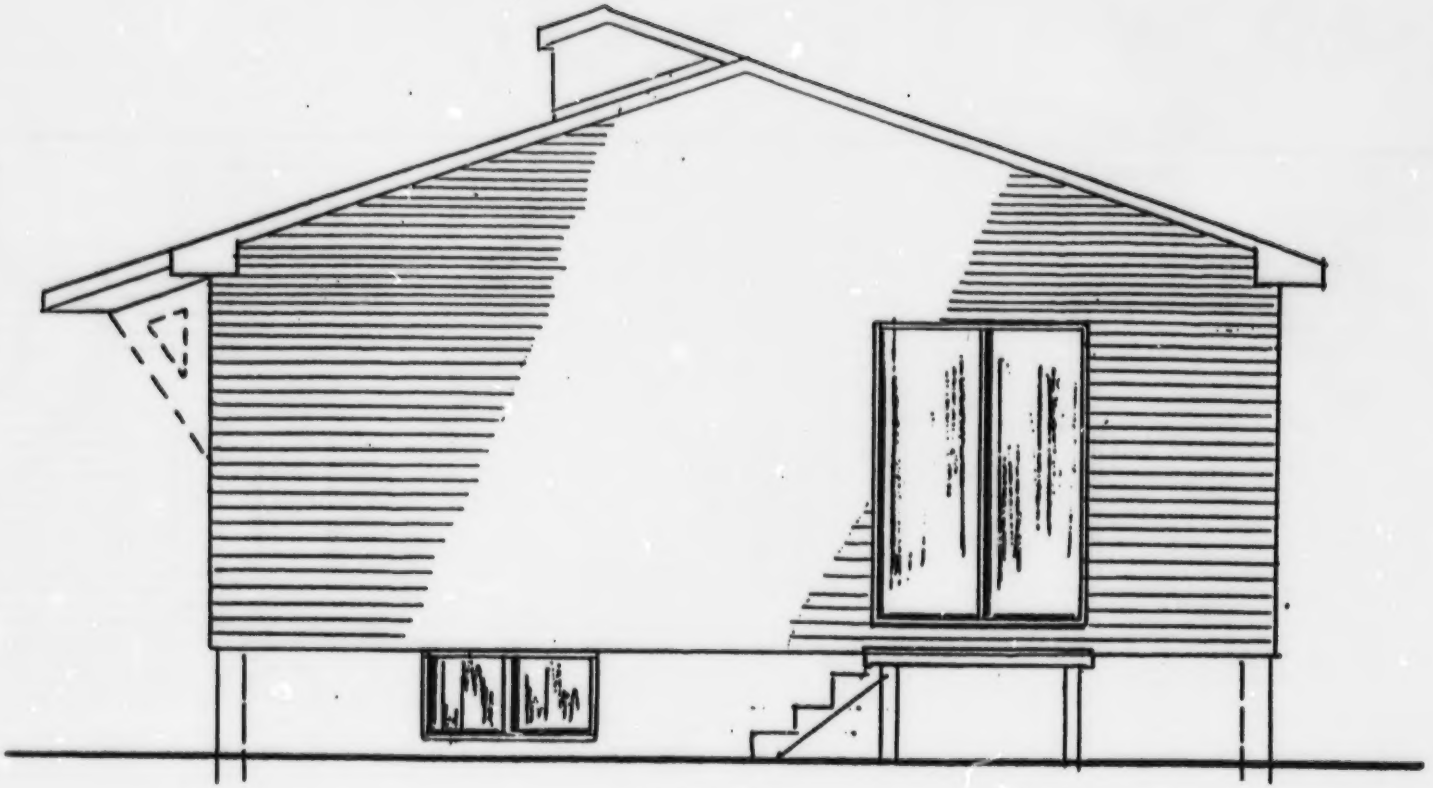
FRONT ELEVATION

THERMOCUBE



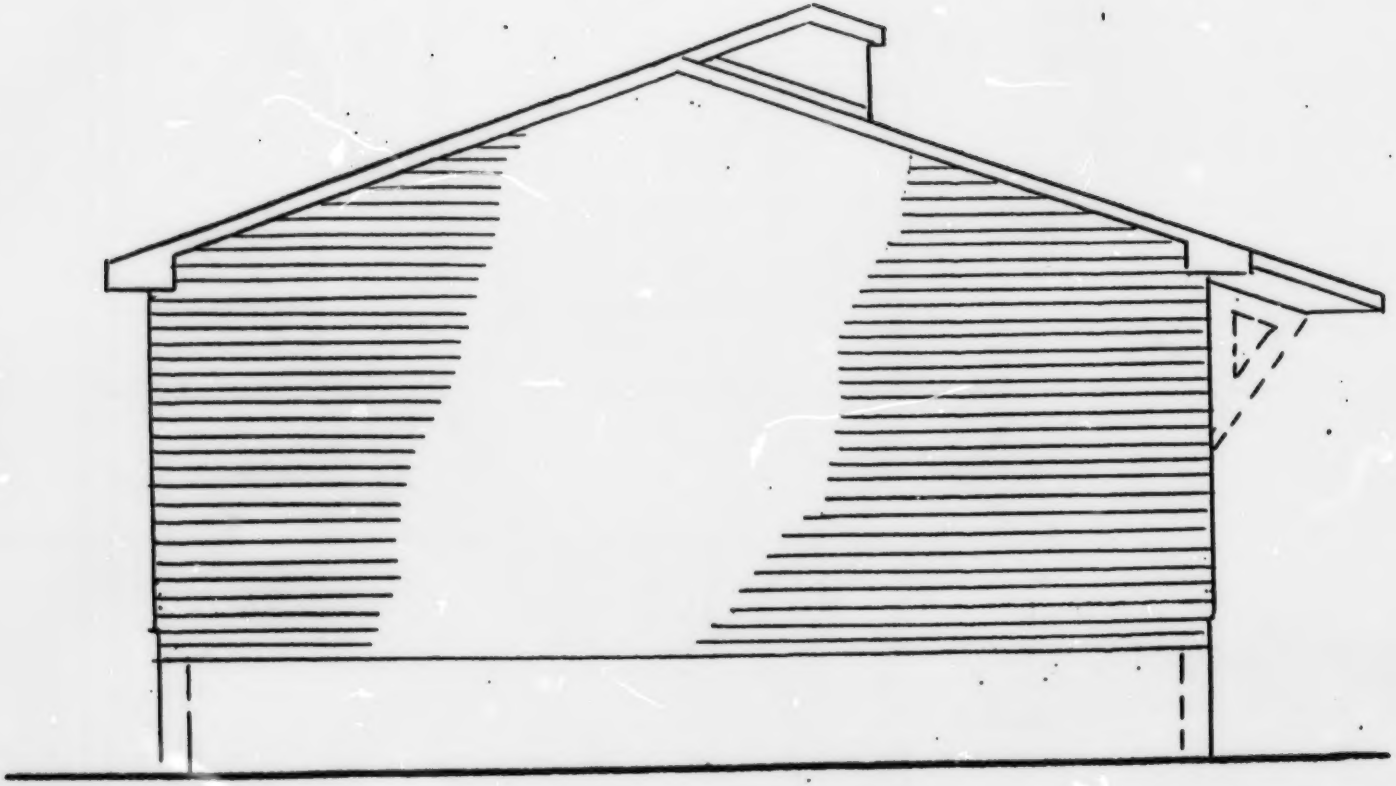
REAR ELEVATION

THERMOCUBE



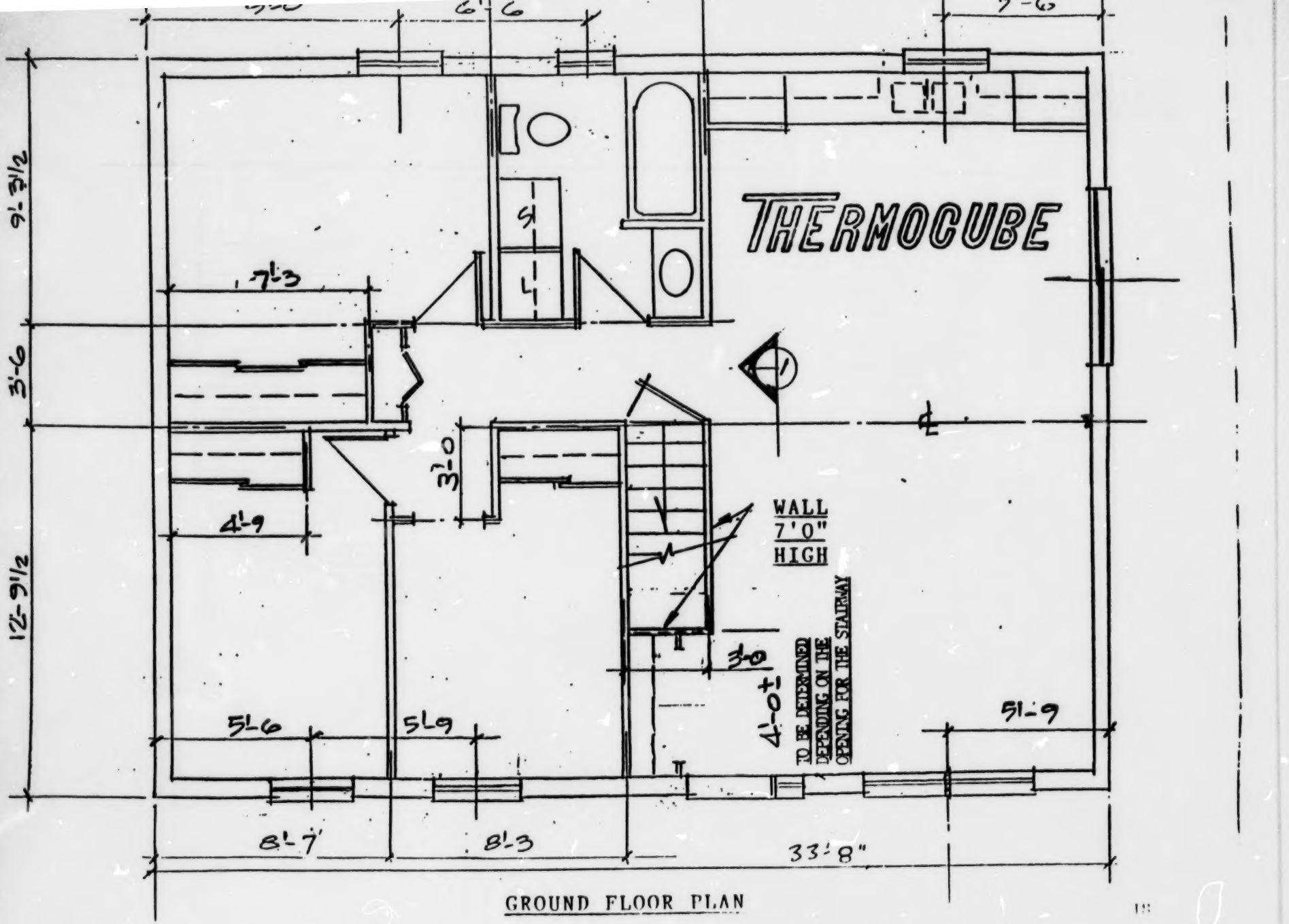
RIGHT ELEVATION

THERMOCUBE

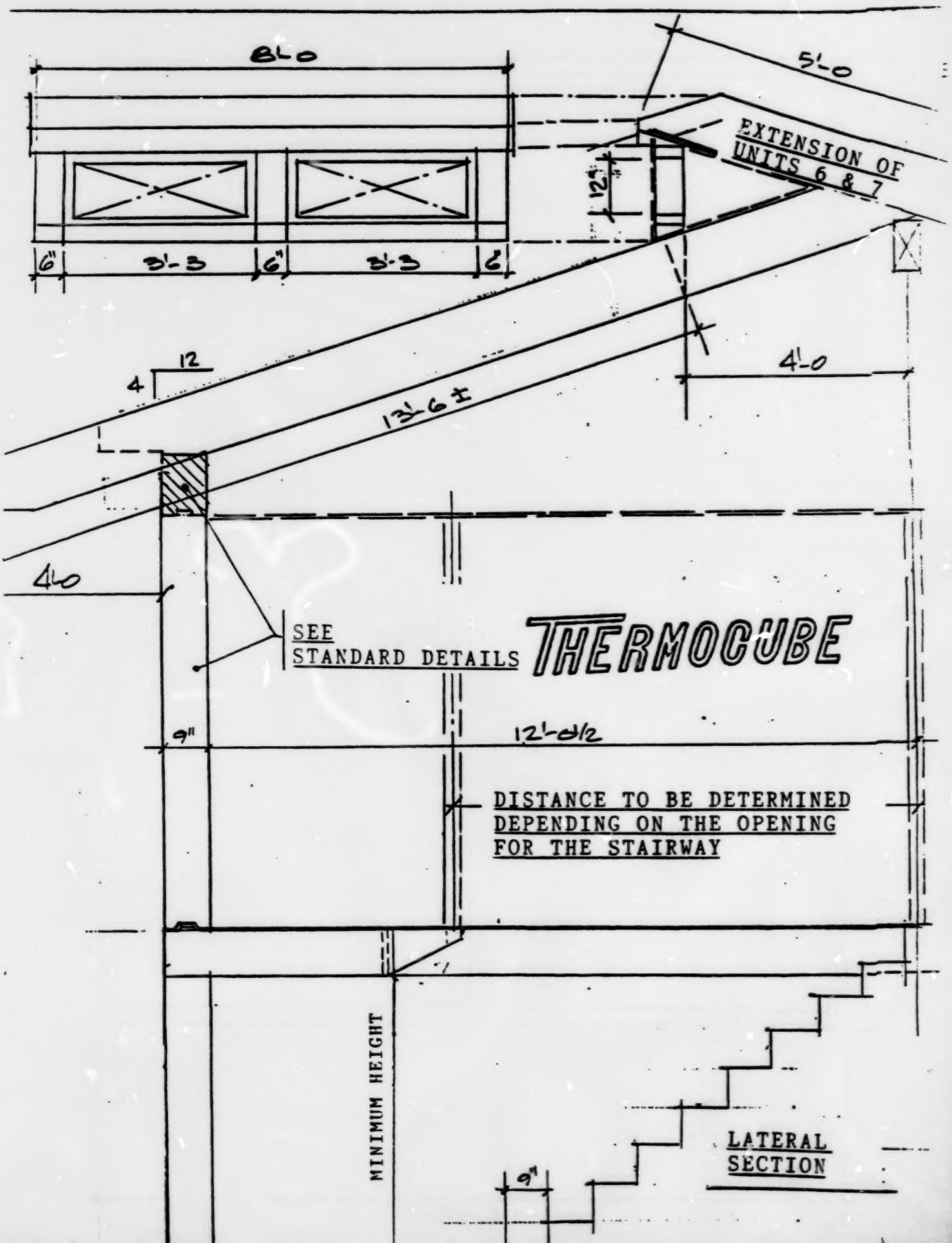


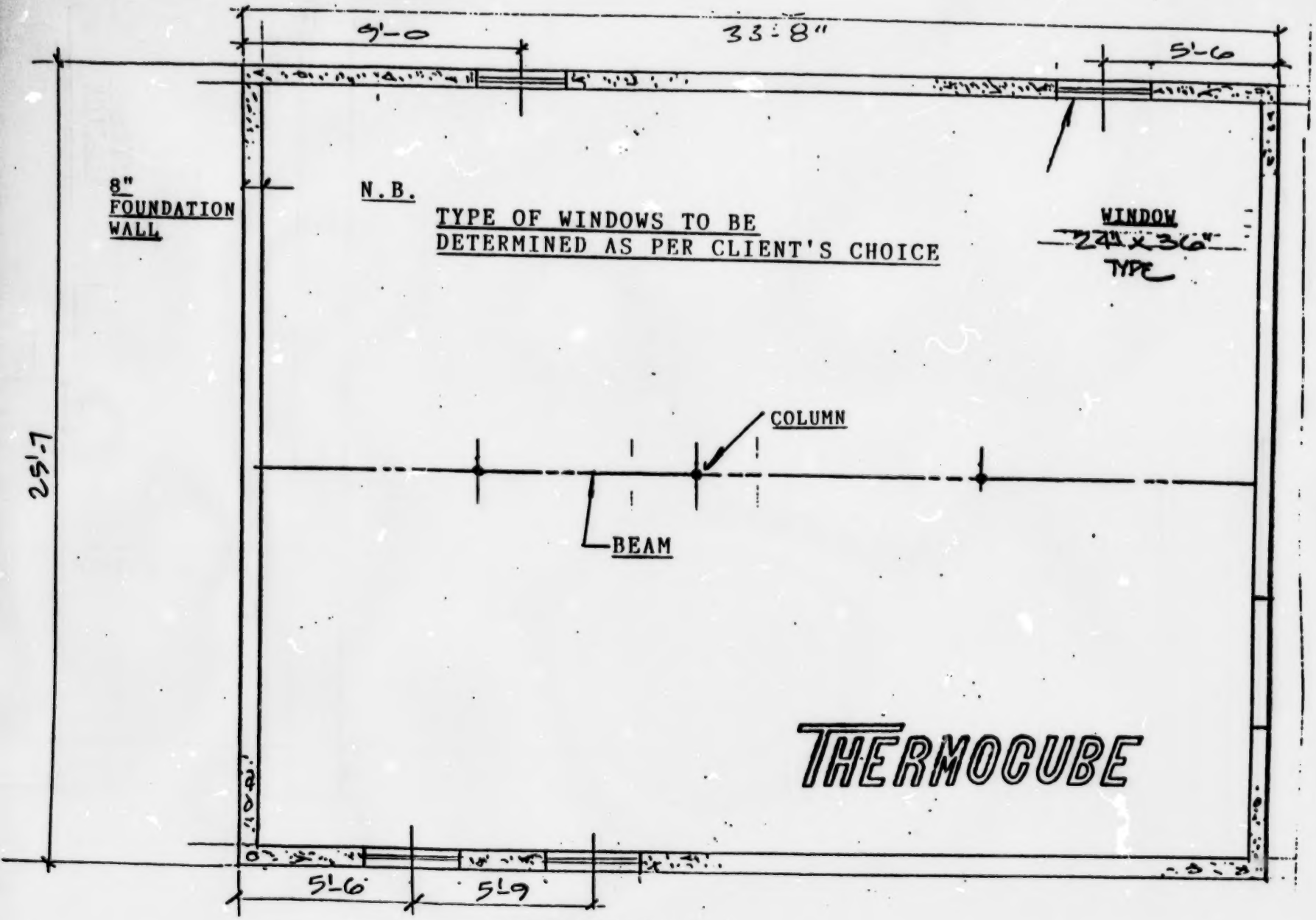
LEFT ELEVATION

THERMOCUBE

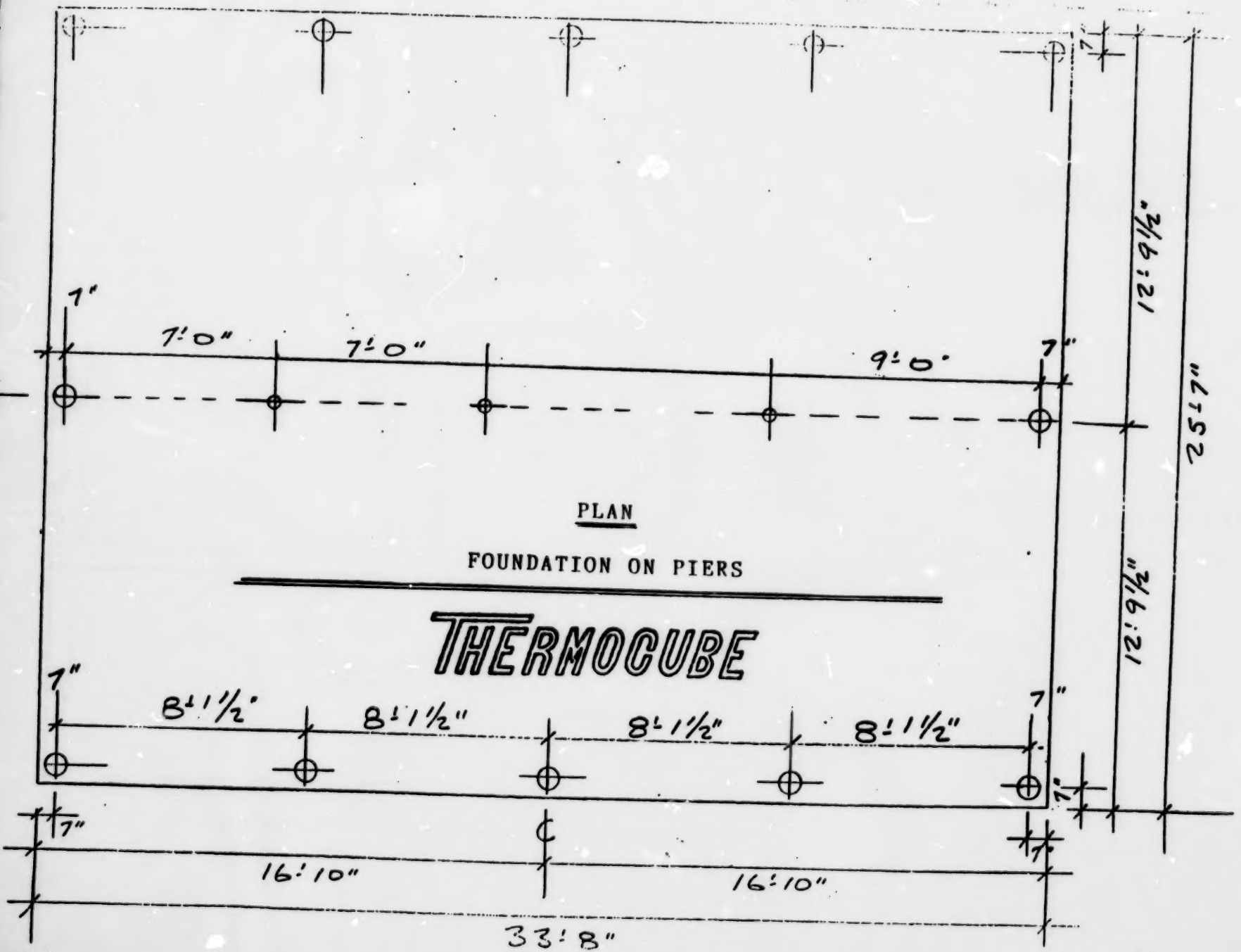


GROUND FLOOR PLAN

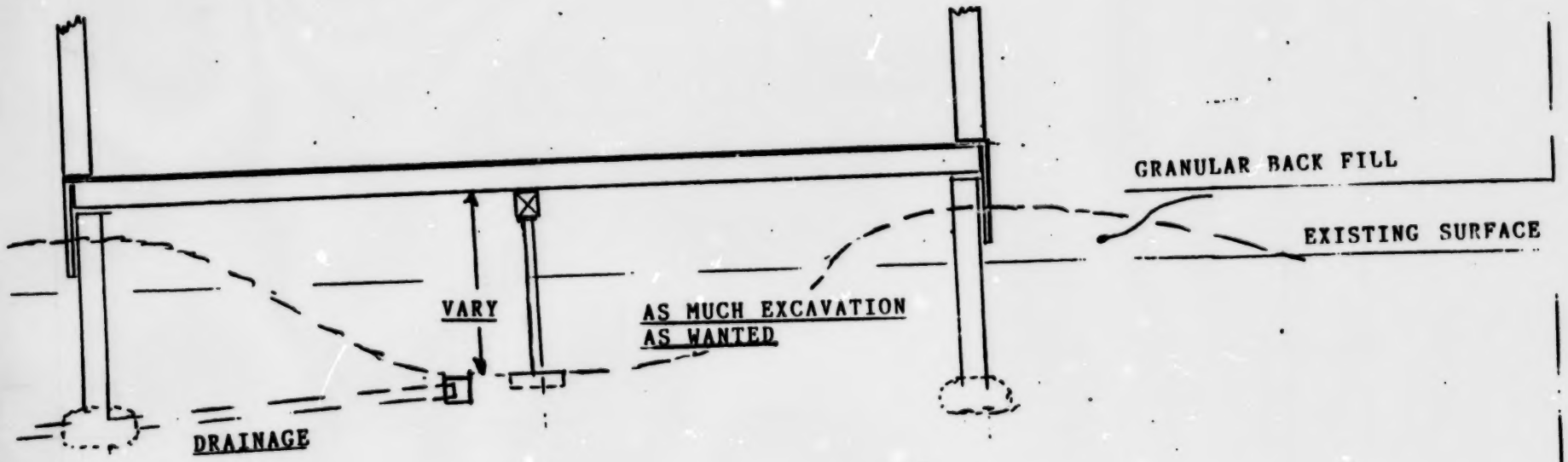

8'-0
5'-0
EXTENSION OF UNITS 6 & 7
12"
6"
3'-3
6"
3'-3
6"
4
12
13'-6"
4'-0
4'-0
SEE STANDARD DETAILS
THERMOCUBE
9"
12'-0 1/2
DISTANCE TO BE DETERMINED DEPENDING ON THE OPENING FOR THE STAIRWAY
MINIMUM HEIGHT
LATERAL SECTION
9"



BASEMENT PLAN

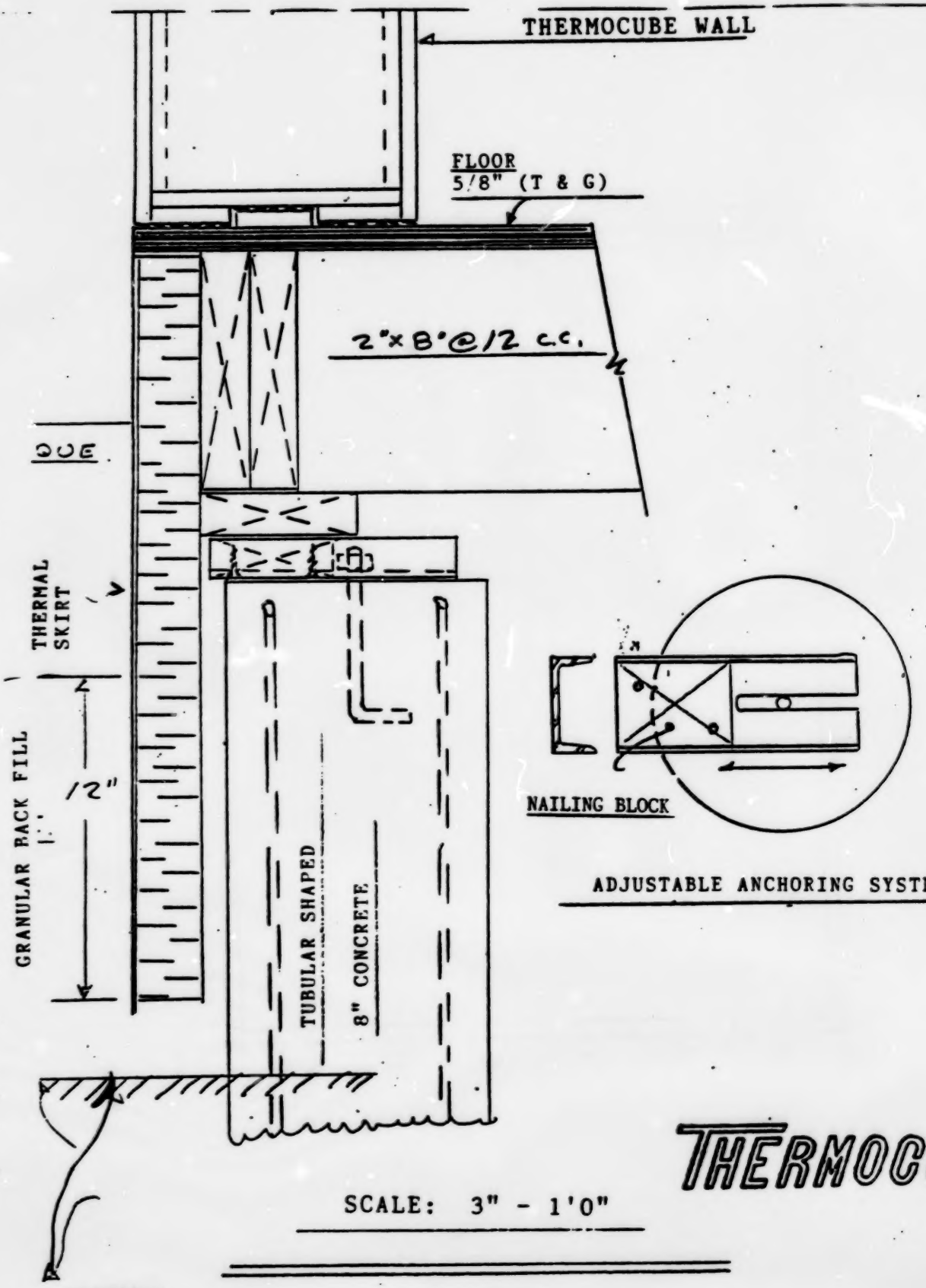

7"
7'-0"
7'-0"
9'-0"
7"
12'-9 3/16"
25'-7"
PLAN
FOUNDATION ON PIERS
THERMOCUBE
7"
8'-1 1/2"
8'-1 1/2"
8'-1 1/2"
8'-1 1/2"
7"
7"
7"
16'-10"
16'-10"
33'-8"

FOUNDATION ON PIERS



SECTION

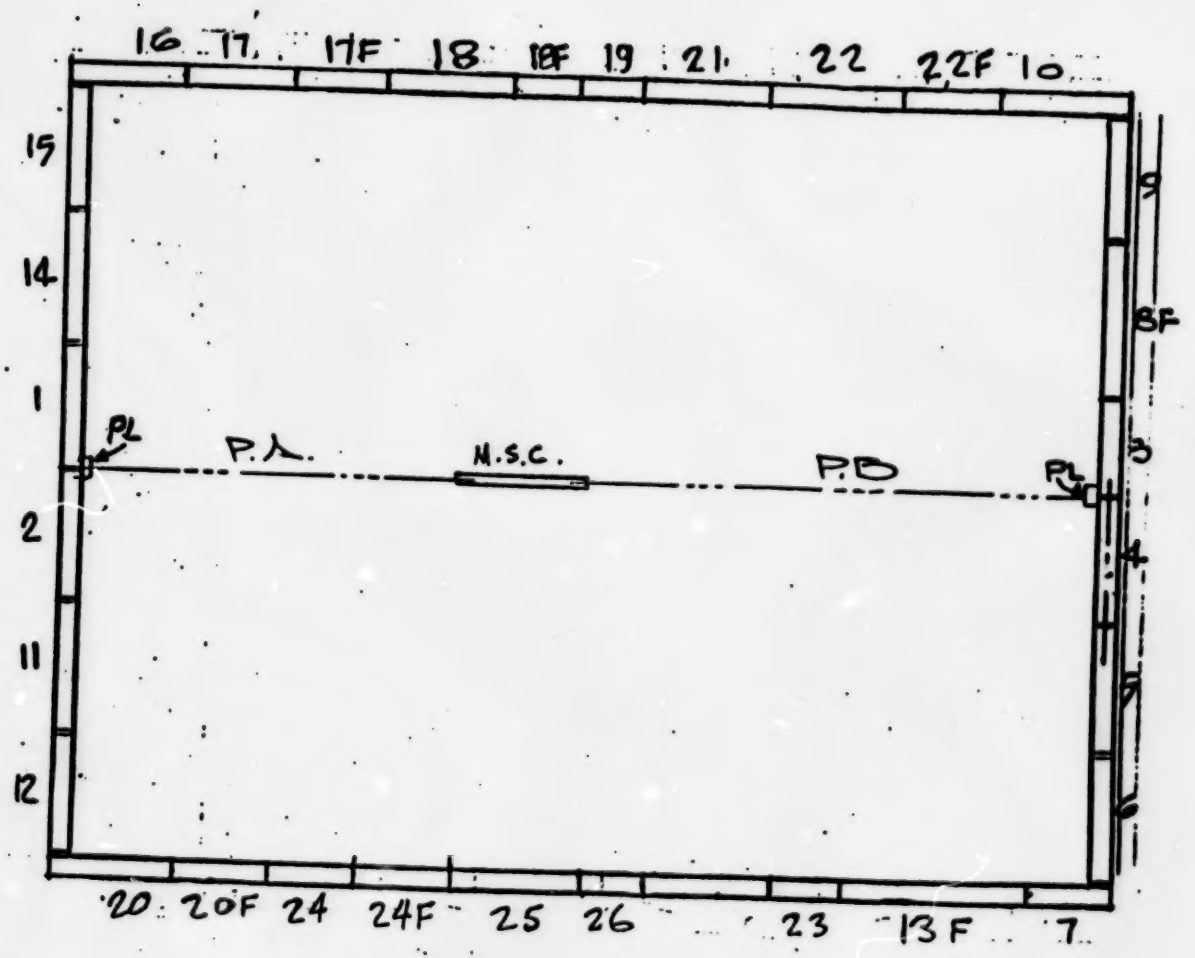
THERMOCUBE



ADJUSTABLE ANCHORING SYSTEM/BASE

SCALE: 3" - 1'0"

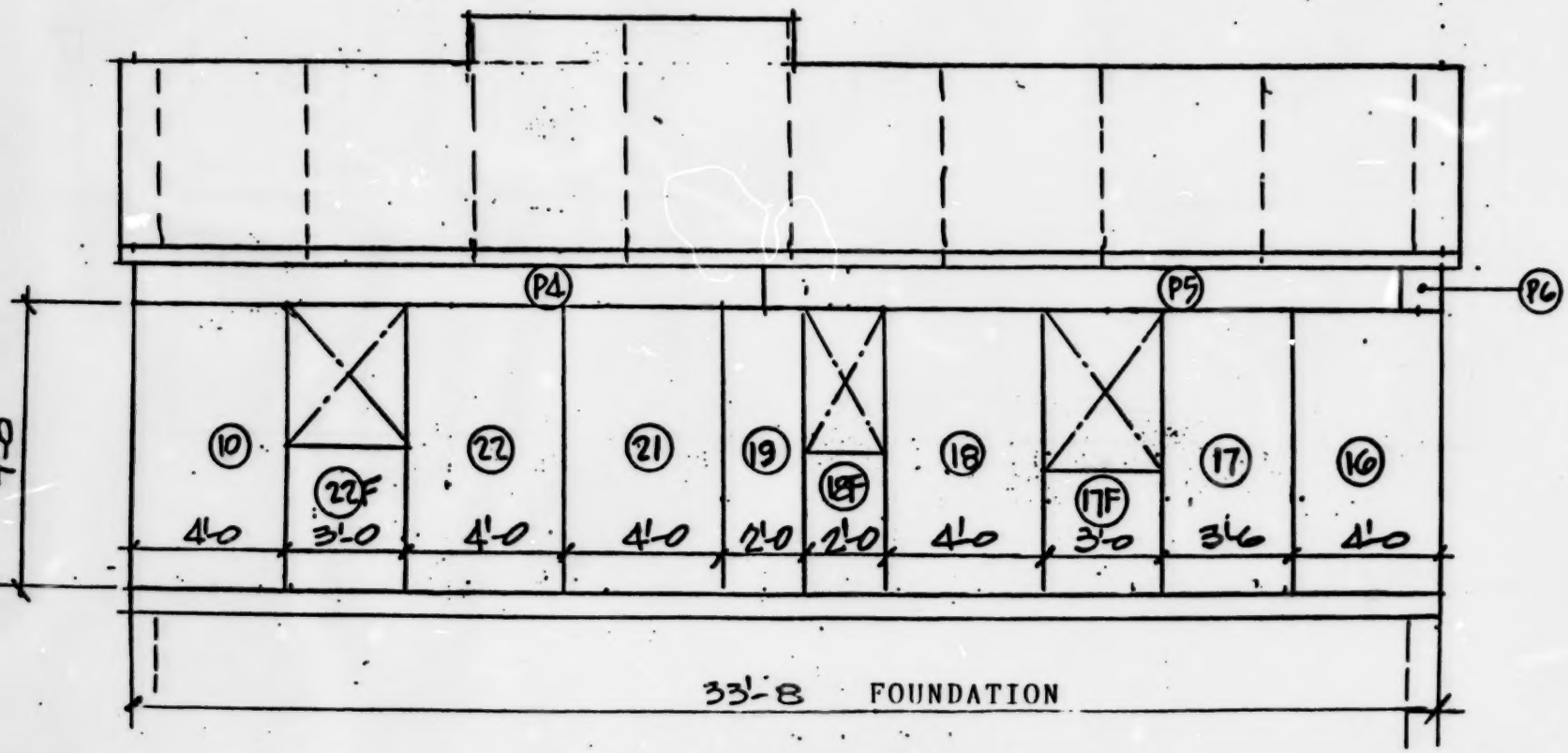
THERMOCUBE



INSTALLATION PLAN - WALL UNITS

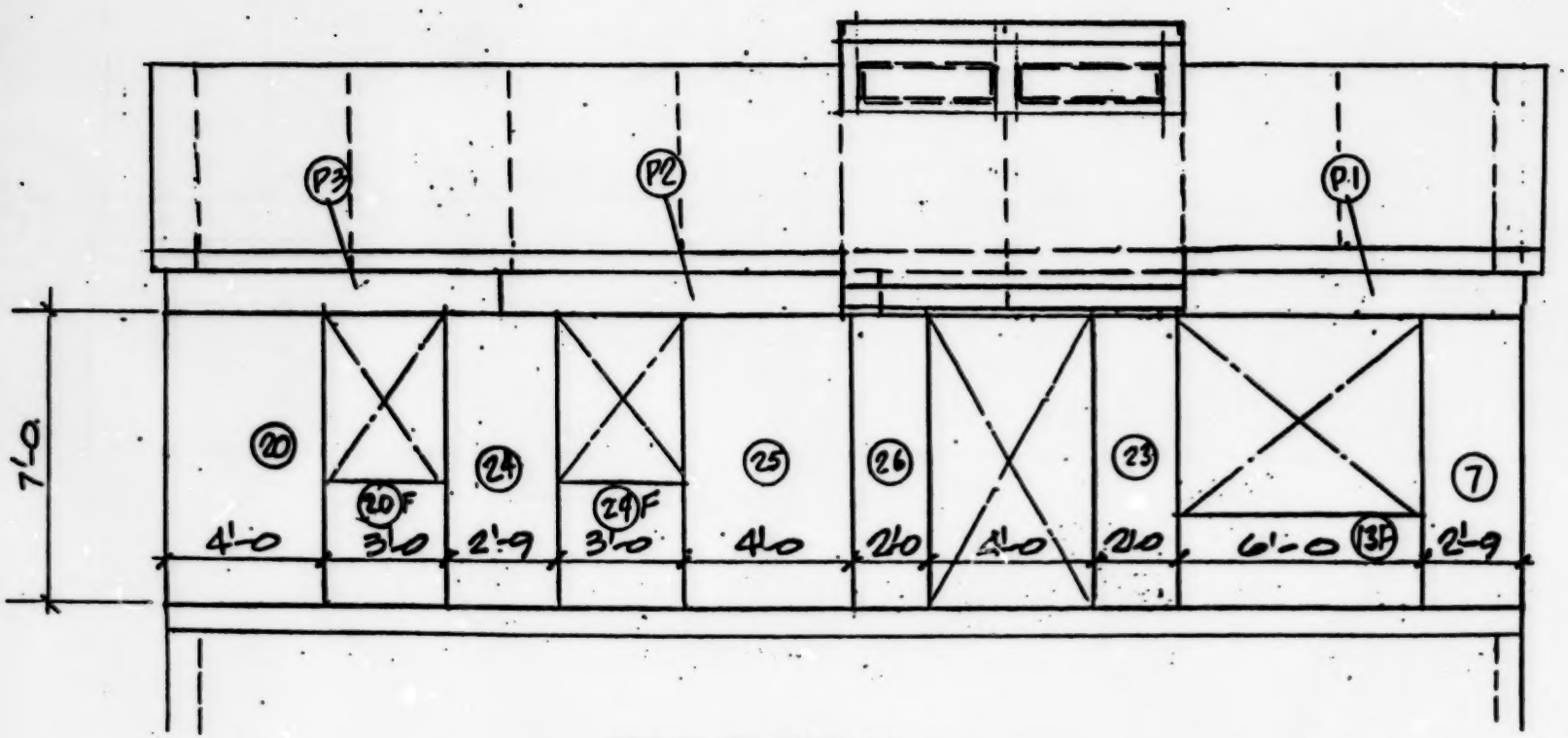
THERMOCUBE

FRONT ELEVATION



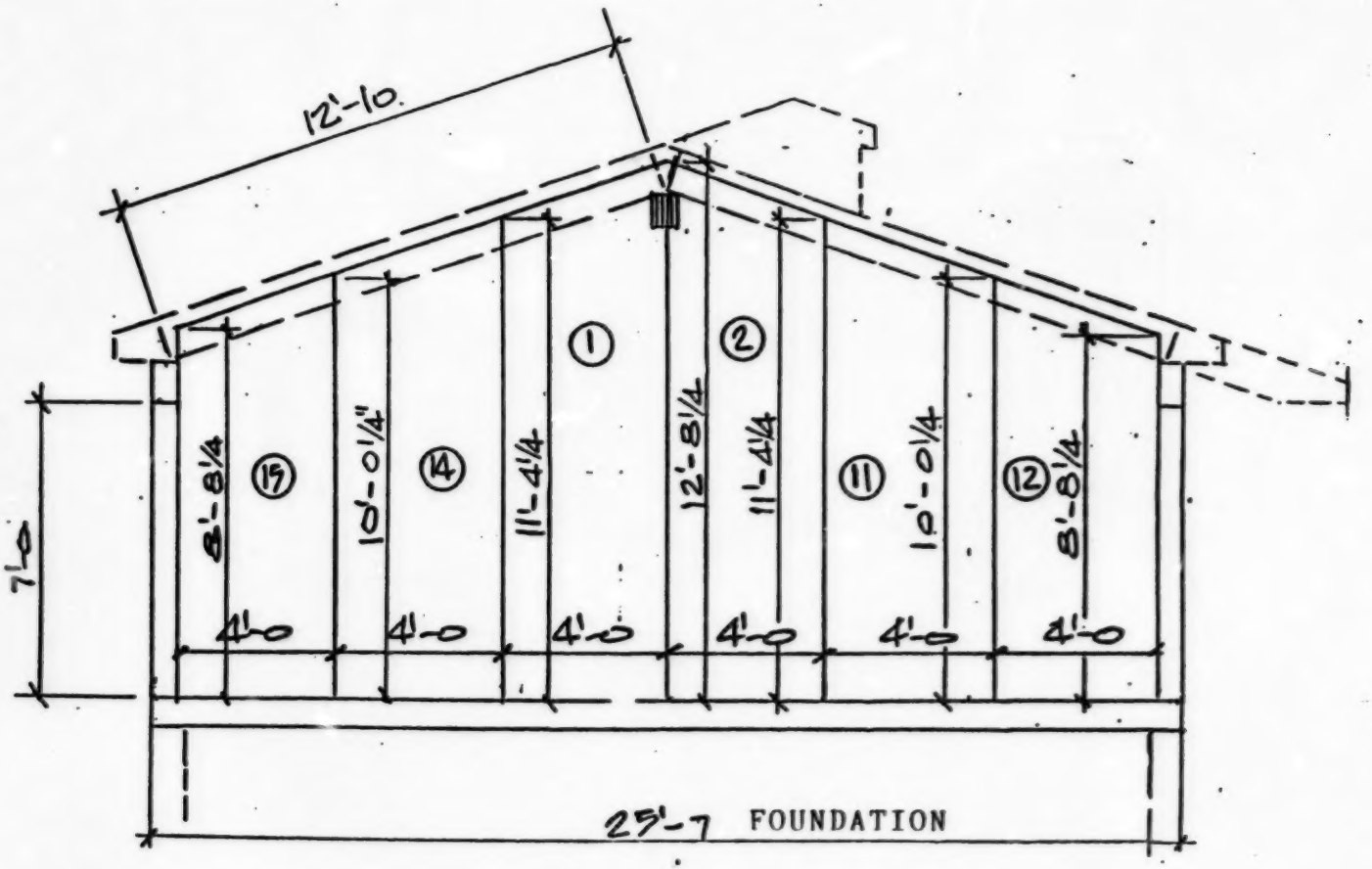
REAR ELEVATION

THERMOCUBE



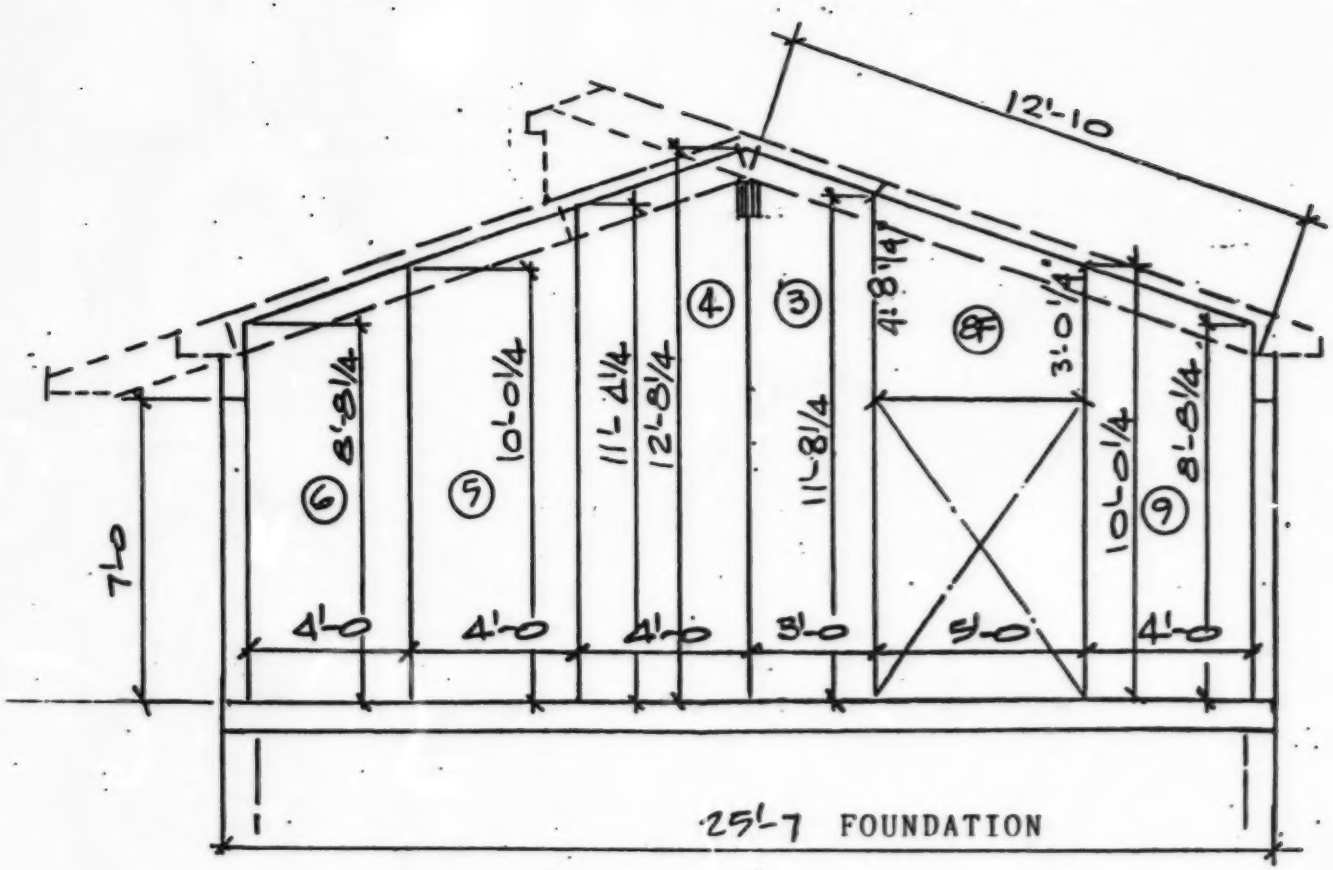
FRONT ELEVATION

THERMOCURE



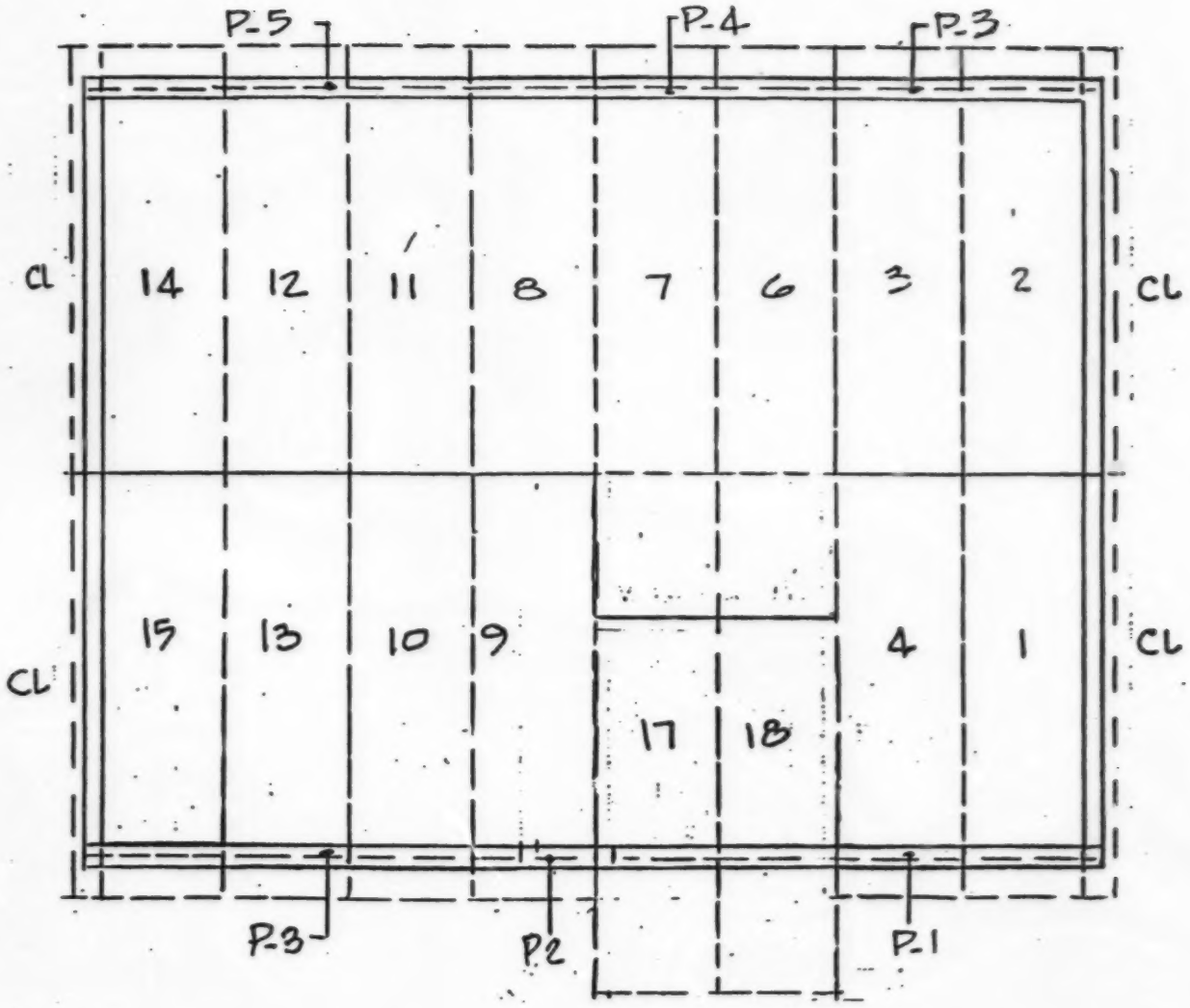
LEFT ELEVATION

THERMOCUBE



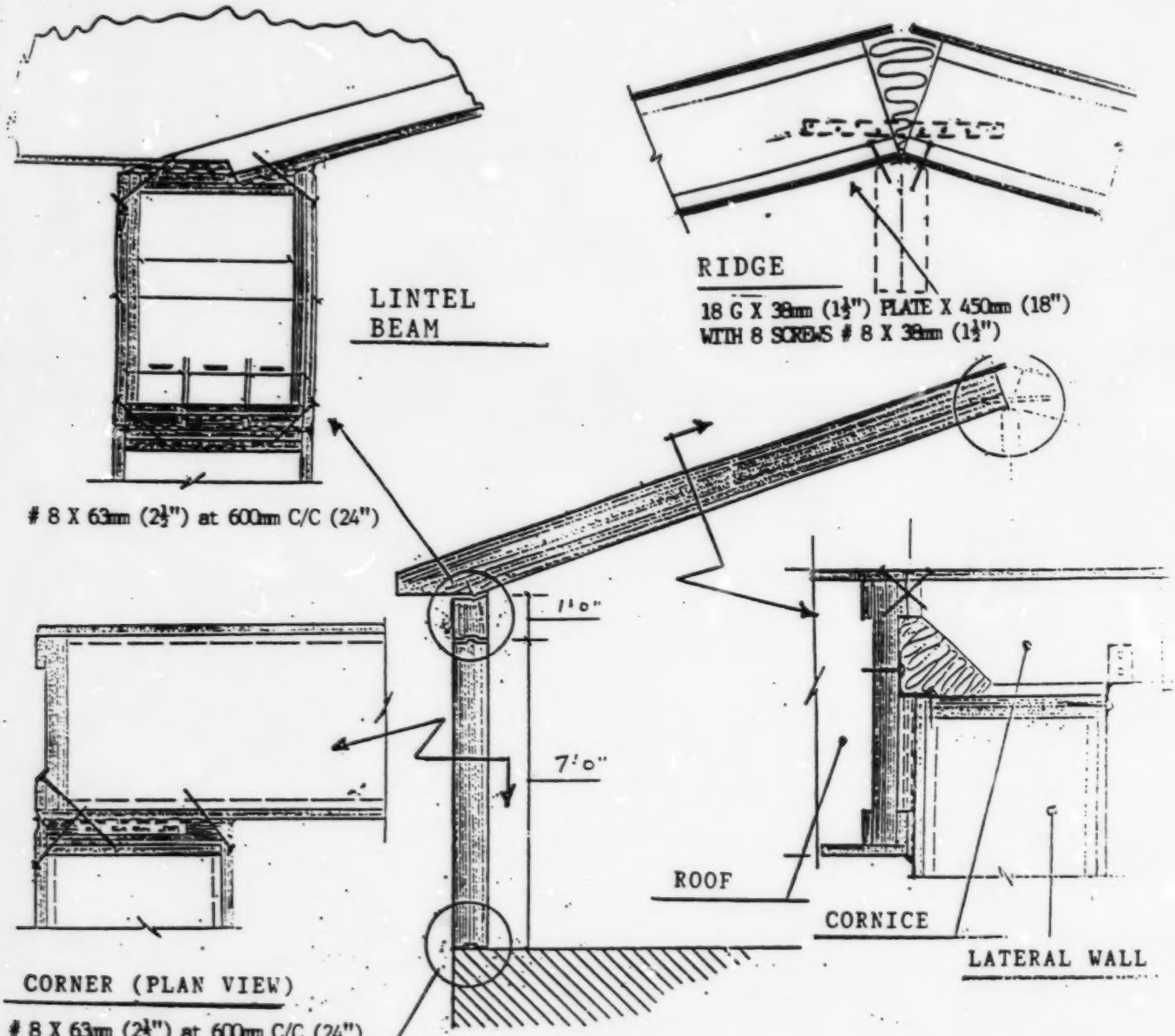
RIGHT ELEVATION

THERMOCUBE



PLAN - ROOF UNITS

THERMOCUBE



TYPICAL SECTION A
WALL & ROOF

JOINTS BETWEEN ROOF PANELS
(UPPER SURFACE)
8 X 63mm (2½") at 1200mm C/C (48")

JOINTS BETWEEN WALL PANELS
(BOTH SIDES)
8 X 63mm (2½") at 1200mm C/C (48")

THERMOCUBE

ASSEMBLING AND ANCHORING DETAILS

ASSEMBLY INSTRUCTIONS

FOR THERMOCUBE'S ONE STOREY

CELLULAR CAISSON CONSTRUCTION SYSTEM
(To be used with assembling plan)

(Contstruction Manual)
Model #2010

WALL PANEL

Preliminary Work:

Ensure that the floor is level, perfectly square and that it respects the dimensions as indicated on the plan.

Trace an exact centre line on the floor along the width and length as per "Installation Precautions" sketch. Then, trace a perimeter line which will assist in installing the floor strips.

Instructions: (To be used with the "Installation Precautions" sketches included with the assembling plan.)

Installing each panel always requires particular attention as pertains to the following points:

A- Ensure that the (insulated) joint packing on the underside (between the wall and the floor) as well as that on the side is installed properly (with the joint linking this panel to the next one).

It is recommended that these insulating strips be attached with a T-50 stapler using 10 mm (3/8") staples, spaced 300 mm (12") o.c., and staggered.

B- Ensure that the lining and anchoring strips on the floor are secured with screws at the points indicated to ensure adequate anchorage between each panel and at each end.

For the exact location and number of screws, see type M 8 fastening details.

C- The panel will be put up by setting it, first of all, in a vertical position on the floor and after having positioned it tightly against the preceding panel which is already in place, the fastening devices linking it to the former panel will be installed, it will then be secured with screws to the floor, and adjusted in a level position using a temporary strut.

Installation:

Proceed with the installation by always following the numerical order indicated on the panel list.

Front and Rear Beams/Lintels:

Once all the wall and corner panels are installed level and parallel, then the beams/lintels are installed, in the order indicated on the installation plan.

Before assembling each of these units, particular attention will be paid to each of the following points: ensure that all the wall units are properly placed and that they are parallel, level and well supported, and that the insulating strip is properly placed along the head of the wall panels on which the beam/lintel will be installed.

Before securing the latter with screws to the wall, ensure that it is level.

Securing with Screws:

Initially, a fastening device is secured with screws in the upper corner of the joint linking the beam to the lateral wall.

Subsequently, this action is repeated for the lower surface of the beam on both sides of each wall panel, thus fastening the wall units to the lower part of the beam. (See details for typical M 8 attaching devices.)

N.B.:

The central part of the beam/lintel which is to be secured to the other must be cut and adjusted for length when it is installed. (This point of intersection must coincide with the centre of a wall panel.) Once the two units of the belt beam are installed, the fastening devices joining these units together will be secured with screws.

ROOF PANEL

Preliminary Work:

Take the following precautions prior to assembling each roof panel:

1 - Ensure that the joint insulation strips are properly placed as per sketch no. 5 and ensure that they are not moved during the installation. It should be noted that the panels along the lateral wall are fastened and screwed on the top of the walls to the lateral cornices. See M 8 fastening device details.

2 - Follow the numerical order for installation as per assembling plan.

Installation:

1 - Place the panel in position as marked on the beam/lintel as well as on the centre beam (upper part).

2 - First of all the centre beam (Ht) will be attached, then the fastening devices on the side will be installed to secure it to the preceding beam (using a perforated metal strip).

3 - It is always important to attach the second panel to the upper part and to the side before screwing the bottom bolts linking it to the belt beam to avoid forcing the latter out of alignment.

Before attaching each panel to the beam/lintel, always be careful to verify the level of the wall as well as the alignment of the whole wall assembly.

It is always imperative, moreover that the panels corresponding to the two sides of the roof be fitted tightly together (at the ridge) and fastened using a perforated metal band.

When the panels are being attached together, one must ensure that the upper surface is flat to avoid any offset, by inserting the screws on an angle as per the details provided with M 8 attaching devices.

4 - The caulking of the upper surface joints as well as the lower surface joints may be done gradually, or at the end of the installation, provided that precaution is taken to prevent water or humidity from leaking into the joints prior to the installation of the roofing.

LATERAL CORNICES

These units rest on the lateral walls and must be placed so that the upper surface is aligned with the upper surface of the roof (see details for M 8 attaching devices). In addition, they must be cut on site along the ridge to ensure proper jointing.

CAULKING

All the joints between each panel as well as at the wall/floor and wall/roof intersections must be caulked both on the inside and on the outside.